Principles of Flight

Lesson Plan: Similar Paper Airplanes

Grade Level: 5

Subject Area: Science & Math

Time Required: Preparation: 1 hour
Activity: 1 hour

National Standards Correlation:

Science (grades 5-8)
• Science and Technology Standard: Understanding about science and technology Standard.
• Physical Science Standard: Motions and forces.
Math (grades 3- 5)
• Geometry Standard: Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships.
• Measurement Standard: Apply appropriate techniques, tools, and formulas to determine measurements. Choose an appropriate unit and measure lengths and widths to a specified degree of precision in customary measurement

Summary:

Students will construct a paper airplane and a similar one half scale in size. The distance each airplane will fly will be compared.

Objectives:

Students will:
• Build a paper airplane following written and verbal instructions.
• Build a similar airplane, half-scale in size.
• Reach a conclusion about how size affects the distance flown.

Background:

See Principles of Flight Introduction and the “Paper Dart Airplane” lesson.

Materials:

• paper airplane pattern
• paper (8 ½” x 11”)
• scissors
• ruler
• colored pencils
• pencil

Safety Instructions:

Do not fly paper airplanes directly at another person. Use caution when flying the paper airplanes. Create a single direction flight zone. Be sure that students stop flying their airplanes when other students are retrieving airplanes that have already landed.

Procedure:

A. Warm Up

1. Discuss symmetry. Explain that it is important to keep the wings symmetrical.

Originally Published as part of Project SOAR: Science in Ohio through Aerospace Resources, Volume I-III. Dayton, Ohio: The National Museum of the United States Air Force and The Air Force Museum Foundation, Inc. 1997-1999.

2. Discuss similarity. Explain that it is important to measure carefully.

3. Review the four forces of flight (lift, drag, thrust, gravity).

B. Activity I

1. Using the paper airplane pattern as a guide, students will measure the dimensions, divide in half and cut out the resulting rectangle.

2. Using the paper airplane pattern as a guide, students will measure, double, and determine placement of all fold lines and cut lines. When complete they should have a similar paper airplane pattern, half-scale in size.

3. Decorate with colored pencils if desired.

C. Activity II

1. Students will construct each paper airplane. (See the "Paper Dart Airplane" lesson at http://www.nationalmuseum.af.mil/shared/media/document/AFD-090709-089.pdf).

D. Activity III

1. Students will fly each plane, recording which flies the longer distance a total of 5 times.

E. Wrap Up

1. Students will compare their results with their classmates. Discuss the results.

Assessment/Evaluation:

Student's airplanes will be checked for similarity. Students can be evaluated by teacher observation of student's participation in the activity.

Extensions:

1. Using the original paper airplane pattern, students could make a double size airplane and conduct the same experiment.

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